

**MULTI-LEVEL POSITION DESIGNATING METHOD  
FOR A MULTIMEDIA STREAM**

**BACKGROUND OF THE INVENTION**

Field of the invention

5           The present invention relates to a multimedia browser and more particularly, to a multi-level position designating method for browsing, editing and indexing a multimedia stream.

Description of the Related Art

10           Generally, a user can obtain information while viewing a multimedia stream as it is played. However, because a multimedia stream is a series of continuous frame units, if a user wishes to view a certain portion of a multimedia stream, the user must designate the starting and ending positions of a range of interest in the multimedia stream. Thus, a user interface which  
15           allows a user to designate a certain position or range of a multimedia stream is necessary for a user to browse, edit or index a multimedia stream.

20           Particularly, a multimedia stream such as a motion movie, drama, or sports has a running time of at least several tens of minutes. Thus, if a user wishes to skip to a certain position or view a certain range of a multimedia stream, an interface for designating a position or range designating of a multimedia stream is necessary. Also, to generate data such as meta-data and to index information such as casting for a multimedia stream,  
25           an interface for designating a position/range of a multimedia

stream would be necessary.

Accordingly, position/range designating methods have been proposed in the related art, in which a user can select a position or range on a multimedia stream by designating a starting and ending positions using a time axis. Fig. 1 shows an example of a position/range designating user interface for a multimedia stream in the related art.

Referring to Fig. 1, an entire multimedia stream A~B is linearly displayed using a scroll bar or slider control, and a range E~F with a starting and ending positions can be designated through an input device. When a range is designated, the user interface displays the starting frame and the ending frame of the range E~F such that a user can determine if the correct range has been selected. As shown, the entire multimedia stream A~B is represented by a one-level display and using the one-level display, the range E~F must be designated.

However, in the above user interface, an entire multimedia stream is displayed by an identical one-level screen as shown in Fig. 1, regardless of the length of the multimedia stream. Therefore, a user would have more difficulty in making a minute or fine selection in a multimedia stream with a longer running time than a multimedia stream with a shorter running time.

For example, assume multimedia stream X has a length of 100 frames and multimedia stream Y has a length of 50 frames. Both multimedia streams X and Y would be represented by a scroll bar

or slider control of a constant length A~B, even though the multimedia stream X has a length twice the length of the multimedia stream Y. Accordingly, assuming that the minimum selection range of the multimedia stream Y is 2 frames, the minimum selection range of the multimedia stream X would be 4 frames. Similarly, the minimum selection range of a multimedia stream having a length of 1000 frames would be 40 frames. Therefore, in such case, a user cannot designate and view a range smaller than 40 frames.

In other words, the greater the length of a multimedia stream, the greater the difficulty to make a fine designation of the multimedia stream. As a result, a user must scroll or slide forwards and backwards along the entire multimedia stream A~B in frame units of the minimum range to find a desired position of the multimedia stream. However, the greater the number of scrolling, the greater the period necessary for a user to find a desired position. Particularly, a substantial period of time would be necessary if a moving picture encoding method such as MPEG is used to implement the user interface. Thus, reducing the number of scrolling would improve the efficiency of the position/range designating user interface.

As discussed above, a position/range designating method in the related art allows a user to select a position or a range by a designation of the starting and ending positions of a desired range. Here, the designation can be made using an input device

such as a mouse or a keyboard and using an interface such as a scroll bar or a slider control. Also, a scroll bar or slider control of a constant length is used to represent all multimedia stream, making it difficult for a user to make a fine adjustment in selecting a desired position or range.

Alternatively, a starting position and ending position of a multimedia stream can directly be input by a user. However, because the user must know the exact or absolute value, i.e. the frame number, of the position to be designated, it is more difficult for general users to use the direct input method.

#### SUMMARY OF THE INVENTION

Accordingly, an object of the present invention is to solve at least the problems and disadvantages of the related art.

Another object of the present invention is to provide an efficient and user-friendly position/range designating method for browsing, editing, and indexing a multimedia stream.

A further object of the invention is to provide a position/range designating method which displays a multimedia stream to allow a user to more accurately select a desired position or range of the multimedia stream.

A still further object of the invention is to provide a multi-level position/range designating method for browsing, editing and indexing a multimedia stream.

Additional advantages, objects, and features of the

invention will be set forth in part in the description which follows and in part will become apparent to those having ordinary skill in the art upon examination of the following or may be learned from practice of the invention. The objects and advantages of the invention may be realized and attained as particularly pointed out in the appended claims.

To achieve the objects and in accordance with the purposes of the invention, as embodied and broadly described herein, a multi-level position/range designating method for a multimedia stream comprises (1) displaying a first level with the entire range of a multimedia stream; (2) setting a designated range from the first level as an absolute range of the multimedia stream and displaying the absolute range in a second level, if a range is designated from the first level; (3) setting a designated range from a previous level as an absolute range of the multimedia stream and displaying the absolute level in a next level, if a range is designated from the previous level; and repeating (3).

#### BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be described in detail with reference to the following drawings in which like reference numerals refer to like elements wherein:

Fig. 1 shows an example of a position/range designating user interface for a multimedia stream in the related art;

Fig. 2 shows an example of a multi-level position/range

designating user interface for a multimedia stream according to a first embodiment of the present invention; and

Fig. 3 shows an example of a multi-level position/range designating user interface for a multimedia stream according to a second embodiment of the present invention.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Reference will now be made in detail to the present invention, examples of which are illustrated in the accompanying drawings. Generally, the present invention allows a user to make a fine or minute selection of a position or range of a multimedia stream through a user-friendly multi-level display of the multimedia stream. Thus, the user can easily and efficiently browse, edit or index a multimedia stream.

Fig. 2 shows an example screen including a multi-level position/range designating user interface according to the present invention.

Referring to Fig. 2, a first level 0 is set to display an entire multimedia stream A~B. Thereafter, if a user designates a range C~D from the range A~B, i.e. the entire multimedia stream, displayed by level 0, a second level 1 is set to display in detail the designated range C~D as the absolute multimedia stream. In other words, both the entire multimedia stream A~B and the range C~D are represented by a scroll bar or slider control of the same length. Finally, the user can designate a

minute range E~F of the entire multimedia stream A~B using the displayed range C~D as the absolute multimedia stream. Here, the starting frames Fs0 and Fs1, and the ending frames Fe0 and Fe1 for the designated range C~D and E~F are respectively displayed at each level.

Namely, to make a fine or minute selection of a desired range E~F, a user can first approximately designate a general range C~D from level 0 which displays the entire multimedia stream. Thereafter, the user can more specifically designate the desired range E~F from level 1 which displays the range C~D as the absolute multimedia stream.

Therefore, level 0 of the present user interface is set to display an entire multimedia stream range A~B, and if a general range C~D is designated from level 0, the range C~D is considered as an entire multimedia stream, i.e. the absolute multimedia stream, at level 1. That is, a detail representation of the range C~D within the range A~B is displayed. As a result, a range E~F desired by a user can be designated, and if necessary, a third level 2 can further be displayed in which the range E~F would be considered the absolute multimedia stream. Accordingly, multiple level representation of a multimedia stream can be displayed, where each level displays a more detailed but shorter range of the multimedia stream to allow a user to achieve a more minute range designation using more detailed views.

However, if a user continuously wishes to display a more

detailed view of a multimedia stream, the multi-level position/range designating user interface cannot display the required number of levels in the limited display area of a screen. Thus, Fig. 3 shows an example screen including a multi-level position/range designating user interface according to a second embodiment the present invention. Namely, the second embodiment allows an efficient display of a multi-level representation of a multimedia stream in a limited display area.

Referring to Fig. 3, a first window 10 displays a first level which includes a scroll bar or slider control representing an entire multimedia stream, and a starting frame  $F_s$  and an ending frame  $F_e$  of a range designated from the entire multimedia stream. In addition, a second window 20 displays subsequent levels  $\{k, k+1, \dots, k+n\}$ , where each level includes a scroll bar or slider control representing a range designated from a previous level as the absolute multimedia stream and includes a starting frame  $\{F_{sk}, f_{sk}+1, \dots, F_{sk}+n\}$  and ending frames  $\{f_{ek}, f_{ek}+1, \dots, f_{ek}+n\}$  for corresponding to a range designated from the absolute multimedia stream.

In the window 20, previous levels  $\{0, 1, \dots, k-1\}$  and subsequent levels  $\{k, k+1, k+2, \dots, k+n\}$  can be displayed as necessary by controlling a scroll bar 20a. Although the present embodiment places the scroll bar 20a on the right side of the user interface 20, the scroll bar 20a may be positioned in other locations such as the left side. Also, input interfaces other



than a scroll bar can be used to display the multi-level representations of a multimedia stream.

Thus, a level including a most current and most detailed range designation can be displayed as well as previous levels by manipulating the scroll bar 20a. Accordingly, a user can view different levels with different ranges of a multimedia stream to skip to or view a desired portion of the multimedia stream.

As described above, in the user interface of the present invention, an entire range or a partial range of a multimedia stream can be displayed more efficiently in a limited display area, thereby allowing a more user friendly way for a user to select a desired range of the multimedia stream. Moreover, when compared with a position/range designating interface in the related art having only level 0, the position/range designating interface of the present invention has multi-levels such that even for a lengthy multimedia stream, a general position or range designation and a minute position or range designation of the multimedia stream can be made.

In addition, the position/range designating interface according to the present invention allows an efficient display of the multi-level representations of a multimedia stream using a scroll bar. Finally, there is no limit in the number of levels, such that a user can achieve a minute range adjustment to select a desired range using each level.

The foregoing embodiments are merely exemplary and are not

to be construed as limiting the present invention. The present teachings can be readily applied to other types of apparatuses. The description of the present invention is intended to be illustrative, and not to limit the scope of the claims. Many  
5 alternatives, modifications, and variations will be apparent to those skilled in the art.

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